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ABSTRACT

Neither a review of the literature nor three data displays (showing career paths, general influence patterns, and predecessor and successor influence patterns) yield a generative or explanatory theory by which to understand data collected on the professional career paths of Alberta (Canada) educational administrators. The data came from a survey of 1,243 administrators and from over 100 interviews. Alternative models, however, can be derived from the application of wave theory to the biology of slime mold. After slime mold has been starved for eight days, certain cells begin pulsating. The pulsations spread in waves and cause the mold to form either "cloud" or "galaxy" patterns or a primordial slug pattern that eventually leads to spore dispersion. Application of wave theory to the Alberta data indicates that, just as only starving slime mold begins pulsating, in all administrative structures the leaders come from one of the poorest units. Wave theory may also explain the rise of specific structures, through one individual whose "pulsations" meet the needs of the group and attract other individuals to the pulsator. Further research is needed to test the usefulness of wave theory for career path analysis. (Author/RW)

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# BIOLOGICAL SYSTEMS AND CAREER ANALYSIS

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# BIOLOGICAL SYSTEMS AND CAREER ANALYSIS

The concepts presented here should not be construed as definitive but evolutionary. After ten years of working with the data on Alberta school administrators' careers, I am only beginning to see its potential. We have probably all realized, upon reflection, how interesting the paths of our own professional careers have been. Our beginning, our training, our indoctrination, our career ladders and our apex while all different are nonetheless similar. Collectively our career paths are fascinating even when considered in the grossest terms. But in terms of understanding organizations, careers in the end may be among the most fruitful avenues of investigation. Questions that ultimately determine the careers of individuals seem to be the ones most frequently asked by an organization's members. Who is to be assigned the task? Who will best use the resources? Who can best deal with X? Who is expendable? Strategies and content are more often dependent upon the actors involved than upon any other consideration.

Since an organization is a collection of individuals bound together by a common purpose, the study of how these members are interrelated and interdependent within and among systems is critical. No one of us goes through a day when we are not constrained by the will or actions of another. At the same time our own rational and irrational behavior impinges on a wide range of people in and outside the organization. The graduate student depressed by the extensive remarks on his term paper unconsciously and unwittingly conveys his feelings to his family; the wife cries and the kid kicks the dog and dinner is ruined. The basic principle is: An action in one part of the system

reverberates throughout the system and affects every other sub-system. No component is unaffected even though the effects NOW cannot be measured (Miller, 1978).

Obviously, the extensive coverage implied thus far cannot be the subject of a twenty minute paper. Therefore, I will confine my remarks to (1) a few brief sentences regarding the review of literature and methodology, (2) several examples of how the career data were displayed, (3) a description of a theoretical construct that appears to be both generative and explanatory and finally (4) will suggest some examples with possible implications when the theory is applied to the Alberta career data.

Brief Review of Literature

You know as well as I the history of career literature. Jason and the Argonauts, King David, Alexander the Great, Genghis Khan, Thomas More, Marie Curie, Albert Einstein ad infinitum are the basis of our common knowledge. Some like David were the last hope of a people. If he succeeded against Goliath, the nation was saved; if he failed, little was lost. With the advent of "our kind" (Social Scientist), Plutarch's Lives and Butler's Lives of the Saints were replaced by testing hypotheses related to correlates of organizations. Grusky (1961) does this in "Corporate size, bureaucratization and managerial succession." Some did indepth case studies of specific organizations. Gouldner's (1957) Patterns of Industrial Bureaucracy is an example. Others provided actuarial accounts of a particular organizational class. March and March's (1977) "Almost random careers: The Wisconsin school superintendent" is a recent case. An even more recent area of study is the everyday lives and conversations of organizational members. Most notable would be Gephart (1978) "Status degradation and organizational succession: an ethnomethodological approach."

Methodology

Eleven years ago, here at the University of Alberta, I began a study of the careers of all those who were or had been in any type of school administration position from that of vice-principal through Deputy Minister of Education for the Province of Alberta. A fifteen (15) page questionaire was constructed around 38 hypotheses noted in career and succession literature. The questionaire was sent to 2167 individuals. Careers in education dated back to the 1920's. The earliest in administration was in 1932. Sixteen hundred and ninety-one questionaires were returned (78.03%). Only 1234 were sufficiently complete to be useful (56.9%). Why so high a return? Two reasons: Dr. T. B. Byrne, then Deputy Minister of Education, strongly supported the research and I dinged them. Over a hundred formal and informal interviews were conducted to fill the gaps or to correct apparent inconsistencies between respondents. I asked for names, dates and places: what positions have you held? When? For how long? Who was your predecessor? Successor? What voice did the predecessor have in your appointment? What part did you play in the choice of your successor? Facts that could be verified and corroborated was the desired goal.

Example of Data Display

Three examples of the type of display are now offered: 1) Career Paths, 2) Influence Patterns (General), 3) Predecessor and Successor Influence Patterns.

1) Overhead A-0137b 1965

Career paths by year could be laid out. The path showed who died in office (H), who moved out and up (J), out and across (C), out and down (I), who retired (g) and who was on temporary loan (a and b).

2) Overhead A-013f 1965

Sociometric influence patterns indicate who acted as sponsors in

career advancement and who the respondent himself thought assisted in his advancement. Note "I", who in the previous schema was demoted out of the organization, is here revealed to have no mutual support bonds, receives no single support, but attributes to eight (8) others support for his career. Even in small structures, like this one, Carlson's ( ) observations provide a corollary here in that top superintendents in a State knew few of his fellow superintendents but knew those in adjoining States in comparable positions. The superintendent in the least desirable position within the State tended to know all those above him. OR, Kelly's ( ) laboratory experiment with artificial hierarchies notes the leader talked to those beneath him only when it was to his advantage and the lowest members tended to talk too often and too long to those above.

3) A-013$F_d$ 1965

Predecessor and Successor Influence Patterns show the predecessor saying (A) he had sole responsibility in selecting his successor and the successor agreeing (A) as indicated by the $\frac{(A)}{(A)}$ or (B) standing for primary responsibility, (C) influential and (D) no voice in the selection.

Patterns were laid out in these and other areas for 57 structures large and small, in school districts, divisions, and counties, institutes, schools, colleges, universities, research centers and provincial government. As a result of this effort it can be said without qualification, it was a hell of a lot of work. Beyond that I am confident, without all the necessary evidence in, that all the work done to date, mine and others, has not provided us with one theoretical construct by which we can understand our data. Some of the insights gained over the years, I believe, are quite useful, such as the works by Christensen (1953), Gouldner (1954), Grusky (1961), Guest (1962), Koter and Sharol (1967),

and Douglas (1970), to mention a few. Others, I fear, are interesting indoor games but offer little else. In this respect, Ginsberg (1971), Tuma (1976) and March and March (1977) are notable. The sum of my objection is simply stated: It is one thing to use mathematical techniques as a tool and quite another to use them in place of or in absence of theory.

Theoretical Construct of Waves

Having made a frontal assault on the "Greats", I am now in a position of high risk. Either the construct will be laughed out of the hall or it will stimulate a great deal of thought and discussion. In this section of the paper I will briefly present a generative theory and in the following section I will attempt to apply it to some few aspects of the Alberta School Administrators' Career data.

Within the theory of relativity, Einstein postulated a light wave theory. Waves begin in different points of the universe and ripple throughout the universe. Since the waves start at different places and at different times with different intensities, patterns of intermingling waves could be expected. If one were to throw a handful of pebbles into a pond several waves could be detected and followed even after they meshed. Each motion set off in a pond affects the lily pad. Whether dominant or minor each wave and intermingled wave is noted in the undulation of the lily pad. The waves can be, of course, calculated mathematically ($\lambda = \frac{h}{p}$). Wave theory is interesting and has been available to most of us for years but we have failed to see its significance for the social sciences. Only in the past few years have biologists become interested in applying the model to biological systems.

Last year we interviewed a young theoretical biologist -- Marcus Cohen -- for a position at the Systems Science Institute at the University of Louisville. Cohen presented a paper and a film showing the application of wave theory in

slime mold. In the slime mold experiments protoplasm were studied under varying environmental conditions. Nothing startling was found until the protoplasm has been starved for eight days. At that point certain protoplasm began to pulsate. The pulsation set up a wave that moved through the slime. On impact of the pulsating wave other protoplasm began pulsating in unison with the initiator. Proximity did not seem to be a factor. A protoplasm juxtaposed to a pulsator may respond to a more distant pulsator. Pulsations and their corresponding waves differ between and among protoplasm. Some seem to be stimulated by one wave but not another. All, except those near death, respond to some particular pulsation.

After the pulsation begins the protoplasm are attracted to the origin of the pulse. Three distinct groupings have been noted: 1) cloud patterns, 2) galaxy patterns and 3) primoridal slug patterns.

1) Overhead - Cloud and Galaxy

The cloud and galaxy patterns seem to be non-directive. They cluster and circle in toward the initial pulsator. They tend to pack in the center but to be rather loosely knit at the boundaries.

2) Overhead - Primoridal

The primordial slug, on the other hand, is formed by protoplasm lining up behind the initial pulsator. The initial pulsator becomes the head or the first protoplasm. Using a stationary ring which forms near the head of the slug, the body moves through. The ring disappears near the tail and another ring forms. The slugs appear to have only a forward motion. Eventually, the slug begins to lift its head until it is standing on its tail. As this occurs, the tail protoplasms die and the skeletal remains form a structure rigid enough to bear the weight of the body and head. Finally, when the slug is completely extended the head becomes bulbous; it ruptures and spores are released.

Now that is interesting! But how can it be applied to career patterns? Of the 57 structures examined there are examples of at least two types of pulsators and two types of organizations. As I learn more of the theory and work with applying the data, I am sure the third distinction will be noted.

Why a biological model for organization - Miller

As an aside because some of you may be questioning the use of a biological model. James G. Miller, Author of Living Systems (McGraw-Hill, 1978) is the president of our University. He is also the founder of the System Science Institute where I spend much of my time. In his theory there are 19 critical subsystems of a living system. The living systems he treats are the cell, organ, organism, group, organization, society and supernational system. All living system process matter/energy and information. Careers in organizations may be considered matter/energy and the interrelationship and intredependency require the processing of information. Anyone wishing a more detailed explanation may refer to Miller's 1102 page book or ask me at the next break, on now to the application.

Application

It is to be remembered that the first pulsators do not begin until after the eighth day of starvation; also not all protoplasm are initial pulsators. In all those structures isolated and examined thus far, the leader (A) has always come from one of the poorest units. No matter if that unit is within a school district, division or county or if it is a district, division or county within the Province. Pulsators and leaders are always hungry. It is not to be assumed that all individuals in poor units have an equal chance of becoming leaders of structures any more than all starving protoplasm have an

equal chance of being initiators. At this point I do not know why some few are and why the majority are not. Nor do I wish to speculate beyond saying that as long as a protoplasm is not at the critical starvation stage, it may well have to become a follower, or, when it begins to pulsate there will no longer be a critical mass left to follow it.

It is noteworthy that some counties in the Province have produced more leaders than have the others. This is also true within school districts where one school tends to produce the greatest number of principals and central office personnel. In no case is such a unit the most prominent. Prominent units generally have strong leaders who tend to hold subordinates within the unit and they tend also not to sponsor them for positions outside the unit. Again, initial pulsators and leaders tend to be hungry.

It is also noted that particular leaders have specific structures that form around them that resemble the proptoplasm cloud or galaxy. Such leaders or their structures generally do not survive nor are they viable for very long. In most cases they have very little effect. It is not clear to me at this point if the length of the survival time is a necessary condition or if a structure under a change of leadership cannot also change structural patterns. One might argue that since the protoplasm in the slime are apparently randomly distributed, that there is only an appearance of order when they form a cloud or a galaxy. It may also be the case that the initial pulsator in the slime may not continue to be the pulsator in any of the three patterns. One could reason to the conclusion, by noting again the fact that there is a direct relationship between starvation and pulsating. Early pulsators may, therefore, die and be replaced by a second level pulsator or by a stronger pulsator. Therefore, it is possible in human organizations that the succession of leaders pulsate at or near the rate of their predecessors. If it is "near"

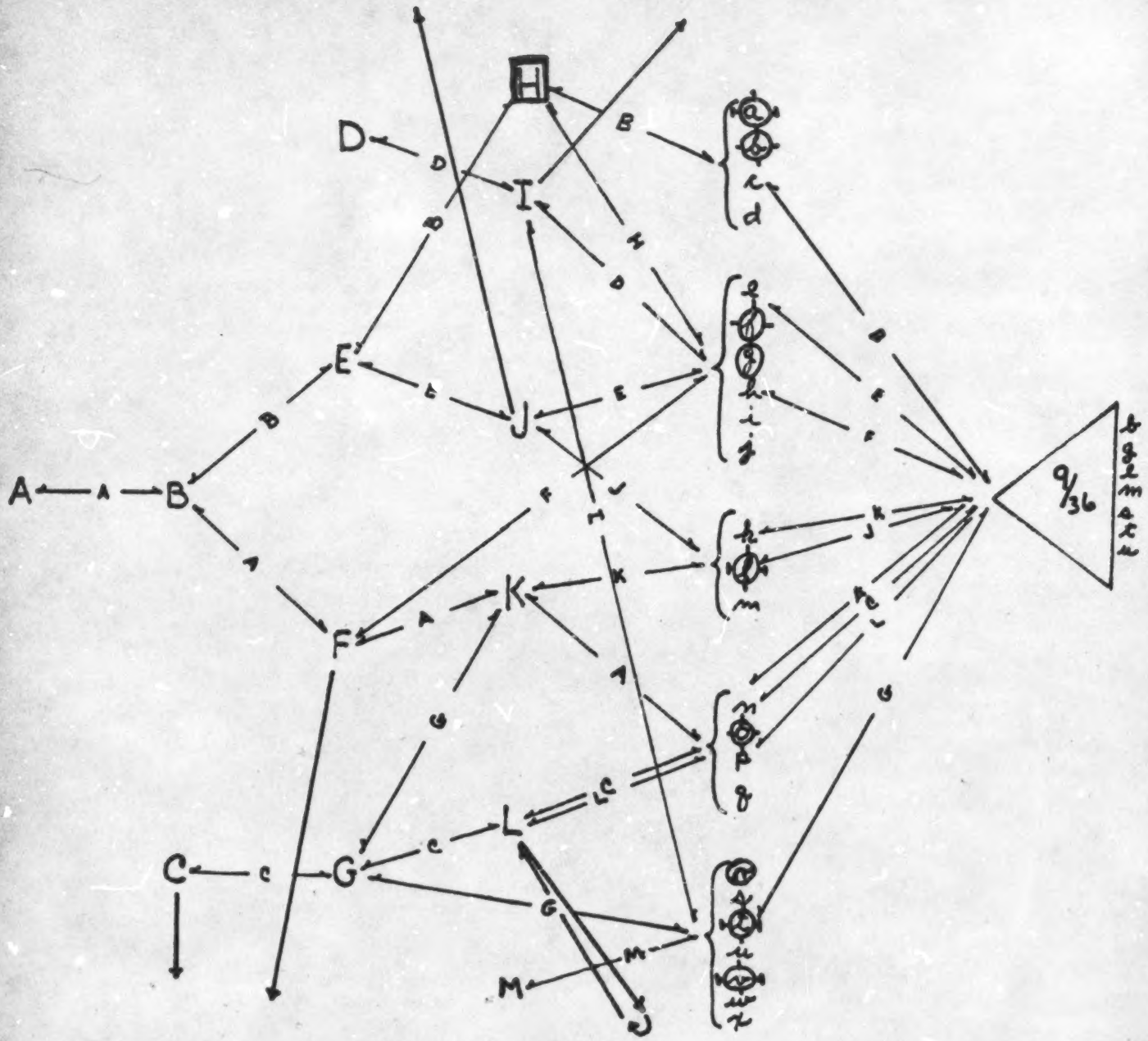
instead of "at" the rate, this would account for the slight variations in organizational behavior that results in successful change.

Finally, I believe that wave theory can account for the rise of specific structures because of one individual who meets the needs of individuals and the group at the time. It is noted in the data that attachments to leaders of structures occur very early in the leader's career. Attachments are not random nor are the members part of a "good old boy" system. If they were random we would expect among the protoplasm no distinct structural patterns. If they were "old boys" we would expect to find all or a majority of members in the beginning still in the organization at the end. What appears to occur is members are attracted by a yet unknown pulsation and remain with the structure only as long as they contribute to its and the leader's goals. The reason the cloud and galaxy types may have shorter lives than slugs is that the support system cannot carry the dead weight, or in the case of the slug there is a greater conservation of energy because of the order of formation and the closer bonding of the individual protoplasm. Groups that tend to persist over long periods of time tend to be more cohesive, that is more homogeneous and goal directed.

Whatever the case may be, the data indicates a highly selective procedure of movement of individuals within and out of the structure. Replacements are selected for the possible success they can bring to the organization. While individuals come and go a small clique of old timers continues. There are several other applications that would prove interesting but since time is short this will have to do.

I have tried in this paper to suggest wave theory can account for some of the phenomena found in careers and structures. Much work needs yet to be done before I am convinced it will work. Like March and March it's a

comfortable indoor game but unlike them it has a generative construct that is derived from living systems and that can serve as a model to test empirical data.



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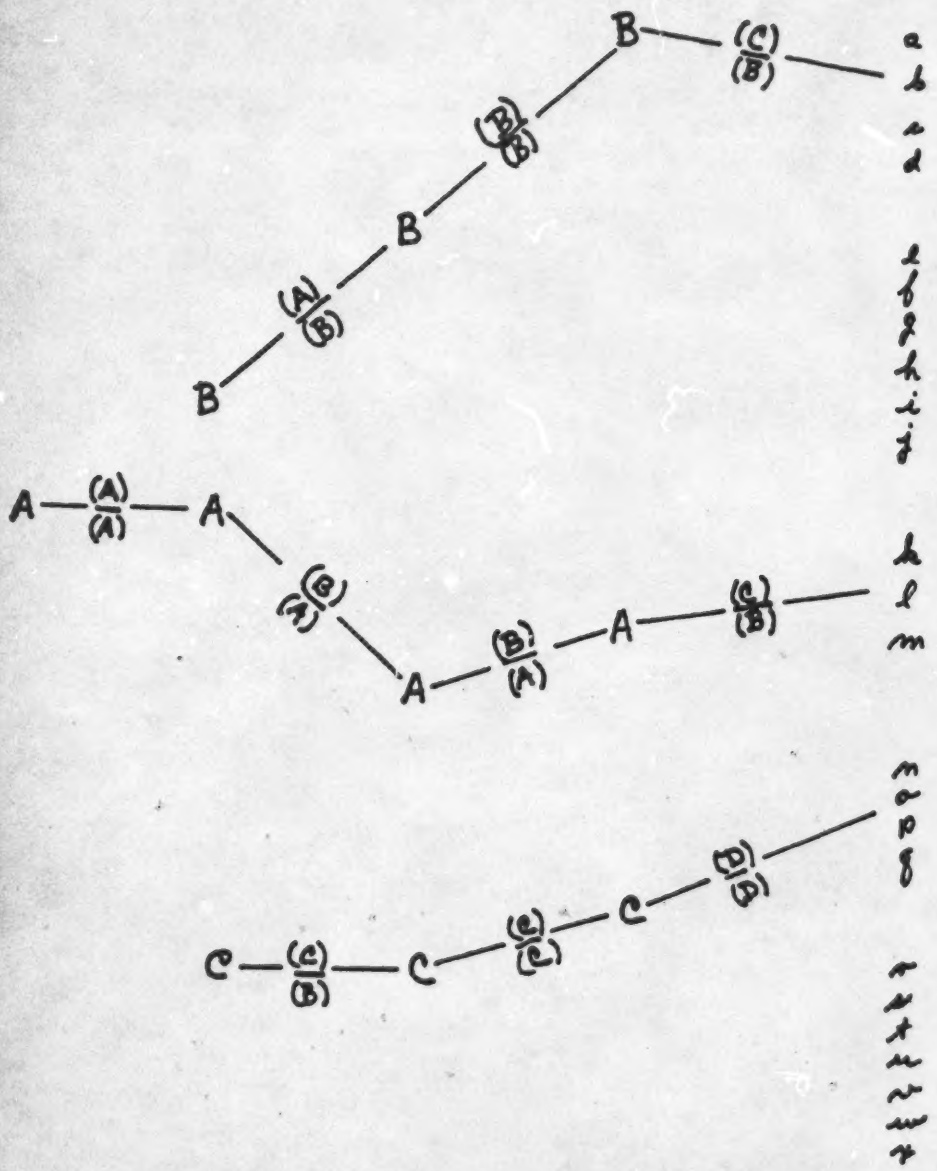

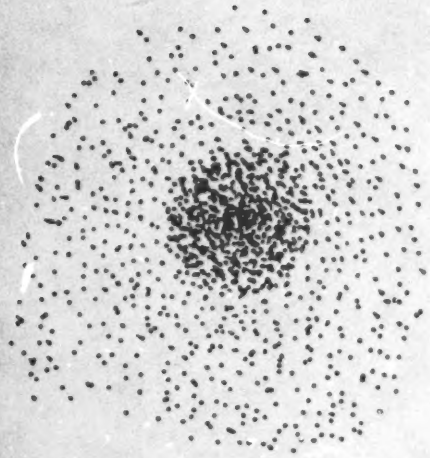

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GALAXY